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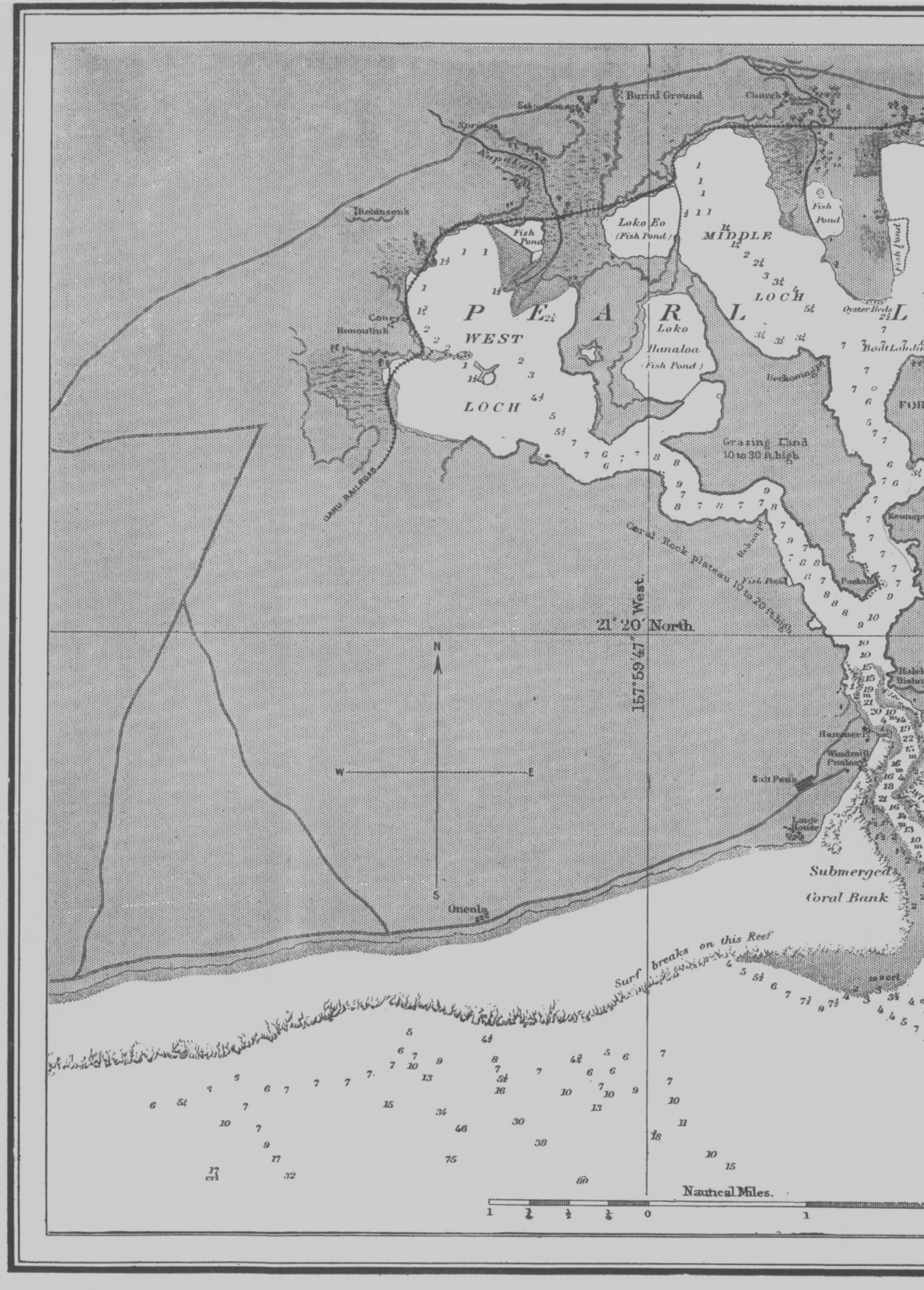
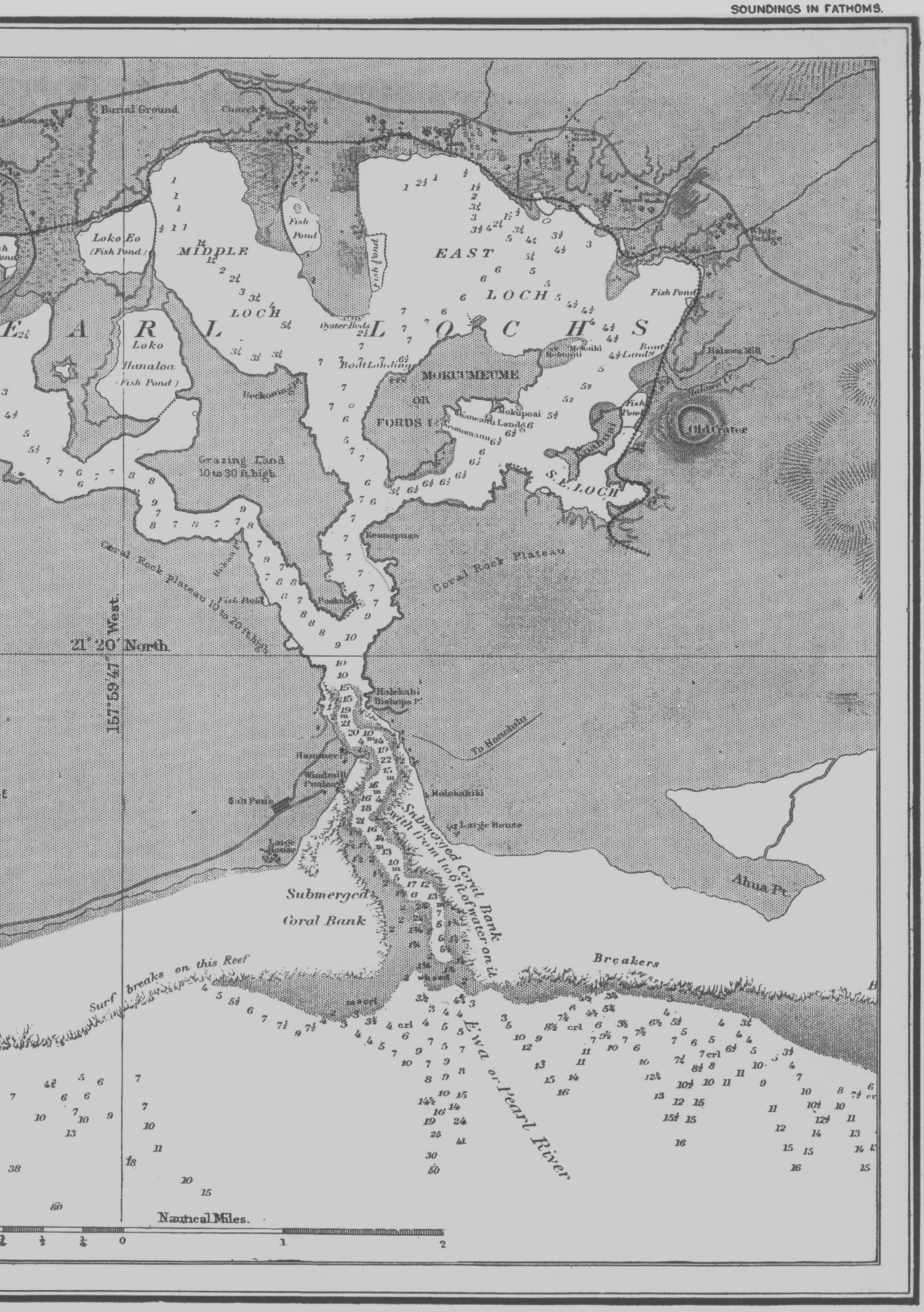
crl. coral, m. mud, s. sand, wh. white.



SOUNDINGS IN FATHOMS.



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THE UNITED STATES MID-PACIFIC NAVAL SUPPLY STATION.

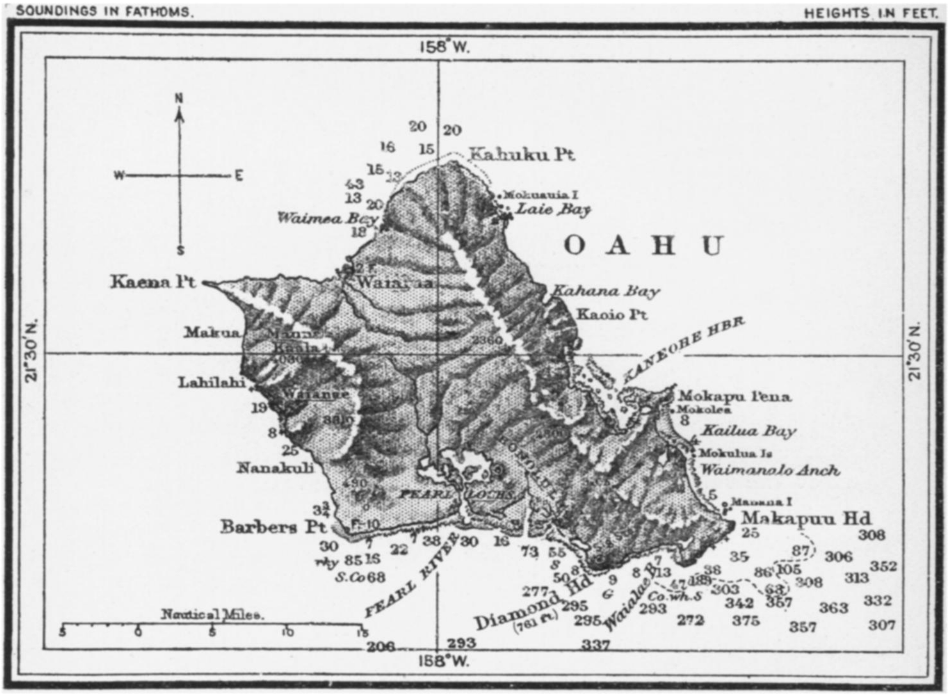
BY

G. W. LITTLEHALES.

There is a valley in Oahu, stretching throughout the island's short length of twenty miles from the ocean on the north coast to the ocean on the south, and bounded on the east and west sides by knife-edged mountain ridges rising to a height of about 3,000 feet. At the northern end of this gorge-like valley, on the ocean edge of the almost level plain into which the ridges of the interior die out in approaching the sea, is Waialua, a port and centre of population of considerable importance in the Hawaiian Islands; at the southern end of the valley, the subsidence of the volcanic mountain, whose top has become the island of Oahu, has brought about the burying of the lower courses of a river, causing the waters of the ocean to flow inward through the river channel and form an irregular expanse of water known as Pearl Lochs. The general depth of the waters of the Lochs is about 50 feet, but the Pearl River, which is the narrow channel leading to the sea, is in general almost twice as deep, except at the seaward entrance, where a bar, running across the channel even with the outer edge of the coral reefs that fringe the coast, rises to within 10 feet of the surface.

This bar was a weighty element of consideration in all the investigations and discussions that took place with reference to the establishment of a United States Naval Supply Station in Pearl Lochs in the decade preceding the ratification, in 1887, of the Convention of 1884 between the United States of America and His Majesty the King of the Hawaiian Islands, in the second Article of which "His Majesty the King of the Hawaiian Islands grants to the Government of the United States the exclusive right to enter the harbor of Pearl River, in the Island of Oahu, and to establish and maintain there a coaling and repair station for the use of vessels of the United States, and to that end the United States may improve the entrance of said harbor and do all other things needful to the purpose aforesaid."

There had been surveys by the officers of the U. S. S. *Kansas* in 1873, of the U. S. S. *Pensacola* in 1875, of U. S. S. *Vandalia* in 1887, which gave complete information about the physical characteristics of Pearl Lochs, but, as far as they touched upon an examination of the formation of the bar, they gave rise to the general belief that both at Pearl River Entrance and at Honolulu, which lies five miles to the eastward, the coral reef that skirts the south side of Oahu extended across the entrances to form solid coral bars. Notwithstanding the anticipation of extensive submarine blasting operations to remove the bar, public opinion clung to the Pearl River region on account of its magnificent capabilities for military defence. In 1892 the Hawaiian Government undertook operations for the removal of the bar at Honolulu and, contrary to the prevailing opinion, found that there is a deep channel filled with sand passing



through the fringing reef of the coast and leading into the basin known as Honolulu Harbor.

This discovery immediately gave rise to the supposition that the Pearl River bar is also composed of sand, and that, therefore, the question of opening Pearl Harbor might be disposed of without undertaking formidable and expensive work. The entrance to Honolulu was deepened from 21 to 30 feet. The whole work was performed in a short space of time by a suction-dredge which pumped the sand from the bar and discharged it behind a retaining wall built upon the reef at the edge of the harbor. Rear-Admiral J. G. Walker set the matter at rest in June, 1894, while commander-in-chief of the Pacific Station, by causing a proper examination of the Pearl River bar to be made by an expedition from his flagship, the *Philadelphia.* They made twenty-eight borings on the bar to a depth of 30 feet below the surface of the water and found nothing but coral sand which had been washed in between the entrance-walls formed by the coral-reef. Lieutenant W. M. Wood, one of the most observant and successful of the surveyors that have been engaged upon the Pearl River bar, reports as follows with reference to the manner in which the sea breaks upon the coast at Pearl River: "It appears that the prevailing local swell setting on this bar is caused entirely by the trade-wind and is more or less heavy according to the strength of the trades. It approaches the bar well from the southward, evidently being materially changed in direction as it sweeps around the eastern end of Oahu. Hence on the bar the wind which causes the swell crosses the latter nearly, if not quite, at right angles to the direction of its progress."

This is a most important observation for him to have made, for in it lies the information that is necessary to explain how the Pearl River entrance came to be filled with sand. The waves of this coast do not approach the land with the line of breakers parallel to the beach, but from the southeastward in a direction slanting toward the beach. Breaking on the eastern headland of the entrance to the river they carry the coral-sand, with which they become laden in their shoreward passage, as far as possible toward the west and then, when their force is spent and the sand is deposited, they slip back into the sea under the force of gravity and by the line of shortest descent.

A look at the accompanying chart will show that the most commodious anchorage is that in East Loch, lying north of Ford Island. It is about half a mile wide and a mile long within the eighteen-foot curve. There are other places where a ship can anchor, but a large ship would have little room to swing. In the reports of twenty years ago upon the suitability of the harbor for naval purposes there was generally to be found a declaration that the place is commodious, but what was regarded as commodious by the commanders of the navy of twenty years ago has come to seem contracted for the manœuvring of the huge ironclads of to-day, and it is doubtful whether the full measure of the expectations of the past can ever be realized in a dockyard on Pearl Lochs.

A final and thorough hydrographic survey of Pearl River and Lochs was made by the officers of the U. S. S. *Bennington* between August and December, 1897, and from the standpoint of the navigator this harbor is probably better known than any other of no greater commercial importance. Since the Hawaiian group has been annexed to the United States public attention has ceased to be centred upon Pearl Lochs, because all the advantages that were sought there are already present in a developed state at Honolulu.